DCA13MR002
Conrail - Shared Assets
Derailment/Hazardous Material Release
Paulsboro, New Jersey
November 30, 2012

Hazardous Materials

Group Factual Report

ATTACHMENT 44 - UNIFIED COMMAND APPROVED CTEH AIR SAMPLING AND MONITORING PLAN

PFD PJD NJDEP TW USCG

CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

CTEH® Air Sampling and Monitoring Work Plan Paulsboro, New Jersey Train Derailment

Prepared on Behalf of: CSX Railroad

Prepared By:

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November 30, 2012

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1 Introduction and Purpose

This work plan addresses air monitoring and sampling for the CSX train derailment near Paulsboro, NJ. The purpose of this monitoring and sampling includes the following:

- Monitor air at the perimeter of the release site to protect the community and emergency response workers in close proximity
- Monitor air at the release site to protect the workers and other personnel located within the incident site
- Monitor air within the evacuated and non-evacuated community to assess potential off-site impact from airborne contaminants originating from the release site
- Provide toxicology and industrial hygiene consulting support and assist with compliance with exposure standards and guidelines

All sampling data will be summarized as soon as available and presented for review onsite.

2 Environmental Sampling and Monitoring Locations and Target Analytes

Real time[1] air and water monitoring and analytical[2] air, water, soil, and sediment sampling may be performed at the following locations:

- Within the work area
- At the perimeter of the work area
- Locations throughout adjacent community and or residential areas
- At selected locations that will address potential off-site receptors, accounting for possible changes in wind-direction
- At selected locations that will address potential on-site receptors in regards to workers

In addition to fixed position monitoring, CTEH® will provide air monitoring assistance to address community concerns related to chemicals associated with the train derailment site.

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[1] The term "real–time air monitoring" generally refers to using handheld, portable direct reading instruments that rapidly detect and display the airborne concentration of a chemical.

[2] The term "analytical air sampling" refers to air sampling methods that involve collection of air samples over a specified period, followed by analysis at a laboratory. The results of these samples represent the average airborne concentration for the sample period. These methods typically involve passing a known volume of air through a collection medium (e.g. charcoal sample tube or filter cassette) that efficiently traps and retains the compound until it can be analyzed by the laboratory. By knowing the volume of air collected, and the quantity of chemical absorbed onto the collection medium, the average air concentration can be calculated.

3 Occupational and Community Exposure Standards and Guidelines

3.1 Occupational Exposure Standards and Guidelines

The Occupational Safety and Health Administration (OSHA) has established workplace standards to protect the safety and health of workers. The American Conference of Governmental Industrial Hygienists (ACGIH) has also established exposure guidelines to protect workers from hazards on the job. Table 3.1 lists the OSHA and ACGIH occupational exposure values for vinyl chloride.

Table 3.1 Occupational Exposure Standards and Guidelines

Compounds	OSHA PEL-TWA[a]	OSHA PEL-STEL[b]	ACGIH* TLV-TWA[c]
Vinyl Chloride (ppm)	1	5	1

*(ACGIH, 2012a)

a. OSHA PEL-TWA = The permissible concentration in air of a substance that shall not be exceeded in an 8-hour work shift or a 40-hour work week (OSHA 29 CFR: 1910.1000).
b. OSHA PEL-STEL = The time-weighted average exposure that should not be exceeded for any 15-minute period (OSHA 29 CFR: 1910.1000).
c. ACGIH TLV-TWA = The Threshold Limit Value-TWA is the concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect (ACGIH, 2012b).

3.2 Community Exposure Guidelines

The American Industrial Hygiene Association (AIHA) establishes Emergency Response Planning Guidelines (ERPGs) to protect communities from the adverse effects of chemicals. USEPA has developed Acute Exposure Guideline Levels (AEGLs)[3] to protect communities in the event of emergency chemical releases. The Department of Energy's (DOE) Subcommittee on Consequence Assessment and Protective Action (SCAPA) developed Temporary Emergency Exposure Limits (TEELs) and Protective Action Criteria (PAC) for over 1,250 chemicals for which ERPGs have not been developed. In cases where AEGL or ERPG values exist, SCAPA adopts the AEGL or ERPG values for the PAC-1, PAC-2, and PAC-3 values. TEEL values should be used only when an ERPG is not available for a given chemical. If an AEGL or ERPG value exists, the TEEL is the same as the

[3] http://www.epa.gov/opptintr/aegl/pubs/results74.htm

AEGL or ERPG. Table 3.2 lists the relevant community exposure values (AEGL and ERPG) for vinyl chloride.

Table 3.2 Community Exposure Guidelines

One- Hour Emergency Exposure Guideline	Vinyl Chloride (ppm)
AEGL-1	250
AEGL-2	1,200
AEGL-3	4,800
ERPG-1	500
ERPG-2	5,000
ERPG-3	20,000

- AEGL-1 is the airborne concentration, expressed as parts per million or milligrams per cubic meter (ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

- AEGL-2 is the airborne concentration (expressed as ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

- AEGL-3 is the airborne concentration (expressed as ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

- ERPG-1 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined, objectionable odor (AIHA, 2011).
- ERPG-2 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action (AIHA, 2011).
- ERPG-3 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects (AIHA, 2011).

In addition, the Agency for Toxic Substances Disease Control (ATSDR) has developed Minimal Risk Levels (MRLs)[4] that are designed to protect the general population for varying durations. The ATSDR has derived and acute MRL for inhalational exposure to vinyl chloride of 0.5 ppm, for exposures lasting up to 14 days.

[4] http://www.atsdr.cdc.gov/mrls/mrllist.asp

4 Real-Time Monitoring

The term "real–time" refers to direct reading instruments that allow nearly instantaneous determinations of a chemical concentration in air. Real-time measurements provide immediate information for worker and community exposure scenarios and, with the use of appropriate site safety measures, help prevent overexposures. Real-time measurements are not directly comparable to OSHA or ACGIH 8-hour TWA values or to community exposure standards or guidelines. Instantaneous real-time samples do not necessarily represent conditions experienced throughout the workday and can substantially underestimate or overestimate exposures potentially experienced by workers. Direct reading instruments perform sampling and analyses within the instrument and concentration readings can usually be obtained immediately. These instruments have fast response times and can follow rapid changes in concentration.

CTEH® will monitor at locations in response to site changes and/or community concerns or requests. Real-time monitoring will be conducted using the Rae Systems MultiRAE Plus, and AreaRAEs with photo ionization detectors equipped with 10.6 eV lamps, and the Gastec GV-1000 piston pump with colorimetric detector tubes. Additionally, the MultiRAE plus PID and AreaRAE will be equipped with O_2 and LEL sensors.

Real-time air monitoring instruments will be used to determine air quality at the incident site or within the community. These instruments include the AreaRAE 5-gas monitor, the MultiRAE plus PID, and the Gastec GV 100. Table 4.0 shows a summary of all RAE equipment real-time instruments and their detection limits.

Table 4.0 Summary of Real-time Instrument Detection Limits

Instrument	Analyte	Energy Lamp (eV)	Correction Factor	Detection Limit
MulitRAE, AreaRAE PID	VOCs	10.6	NA	0.1 ppm
MulitRAE, AreaRAE PID	Vinyl Chloride	10.6	2.0	0.2 ppm
RAE systems LEL Sensor	LEL	NA	Varies	1%

*NA = Not Applicable

4.1 Photo Ionization Detectors

MultiRAE and AreaRAE PIDs are used to measure airborne concentrations of volatile organic compounds (VOCs). Photo ionization is a nondestructive technique that is somewhat specific through selection of ultra-violet (UV) lamps of varying energies. PIDs use high energy UV light from a lamp housed within the detector to provide energy needed for ionizing VOCs. Ions are collected in an ionization chamber with accelerating and collecting electrodes designed to measure current. Current produced during VOC ionization is proportional to VOC concentrations.

PIDs are not specific for any chemical. The presence of atmospheric humidity and other VOCs may be problematic while using the detectors. PIDs often need to account for background readings and need to be coupled with other real-time instruments. The 10.6 eV PID lamp will be used to monitor for VOCs, including vinyl chloride.

4.2 Colorimetric Detectors

Gastec colorimetric detector tubes will be used to determine concentrations of vinyl chloride. Gastec detector tubes contain detecting reagents specifically designed to detect the target chemical. These thin glass tubes have printed calibration scales, which allow the user to directly read airborne concentrations of the substances being measured. Gastec detector tubes are hermetically sealed, the inner diameters are controlled, and detecting reagents with long-term stability are selected. All detector tubes undergo stringent quality control, and each production lot is independently tested and calibrated. Table 4.2 list colorimetric tubes and their detection limits.

Table 4.2 Colorimetric Tubes and Detection Limits*

Instrument	Analyte	Tube Number	Detection Limit	Sampling Volume
Gastec GV100 with Colorimetric Tubes	Vinyl chloride	131L	0.02 ppm	400 mL

* Alternate tube numbers may be used if needed

4.3 Real-Time Air Monitoring Locations

AreaRAE 5-gas monitors will be utilized as semi-fixed positions monitors. There will be a total of 4 AreaRAE units in locations on the perimeter of the release site (more units may be added as site conditions change). The AreaRAEs will be positioned at heights representative of breathing zone levels. AreaRAEs may be positioned throughout the work site to monitor areas of interest regarding

worker density and/or operation sensitivity. During work site operations, AreaRAEs may be positioned at locations proximal to the work as a means of early detection.

In addition to fixed sampling stations, the AreaRAEs may be utilized as mobile air monitoring units. The mobile units will monitor air along navigable roadways throughout adjacent community and among the work site roads.

5 Analytical Air Sampling

Analytical air sampling may be conducted for the purpose of collecting data that represents TWA concentrations of contaminants throughout the day. When applicable, sampling will be conducted and analyzed for VOCs, specifically for vinyl chloride. Sampling will be responsive to onsite activities and total samples collected each day may change.

Personal samples may be collected, in accordance with the OSHA substance specific standard 29 CFR 1910.1017, if vinyl chloride is determined to be present in the work area at sustained concentrations exceeding the OSHA PEL of 1 ppm. This determination will be made based upon results from site assessments conducted using real-time direct-read instruments.

All samples will be held according to method/laboratory requirements and will be shipped to an AIHA accredited laboratory for subsequent analysis. Analytical air sampling methods for vinyl chloride are summarized in Table 5.0.

Table 5.0 Summary of Analytical Air Sampling Methods

Analyte	Analytical Method	Sample Media	*Flow Rate (mL/min)*	*Max Volume*
Volatile Organic Compounds	EPA TO15	1 Liter Mini-Can	-	1L
Vinyl Chloride	Modified NIOSH 1007	Treated Charcoal tube 226-01	50	0.7 - 5L
Vinyl Chloride	Modified OSHA 75	Carbosieve Orbo-91	50	3L
Vinyl Chloride	Modified NIOSH 1007	OVM 3M-3520	-	-

5.1 Personal Exposure Sampling

Personal exposure sampling may be conducted on personnel performing work at the derailment site. Train wrecking, mitigation, and/or remediation operations require site personnel to work in close proximity to the spilled product and contaminated soil. An example of jobs and tasks that may require personal monitoring include:

- Equipment Operators
- Train Wrecking Crewmen (ground men)
- Product Transfer Workers
- Air/Environmental Sampling Crew

6 Data Management

- All analytical air samples will be sent to Galson Laboratories, an AIHA Accredited Laboratory located in East Syracuse, N.Y.
- A request for complete data packages will be made to the laboratory for all samples analyzed.
- The data packets will be reviewed and the data will undergo a data validation process.
- All real-time instruments will be calibrated according to the manufacturer recommendations or as determined necessary by CTEH personnel.
- Calibration logs will be completed daily.
- Real-time readings will be documented by handwritten notes, handheld PDA, or by the use of data logging capabilities of the instrument, if available.
- Real-time data will be entered onsite and drafts made available upon request.
- Preliminary summaries of the data collected from the previous day will be provided daily at 07:00.

7 Project Organization

CTEH will be responsible for the following:

- Air monitoring
- Toxicology support
- Quality Assurance/Quality Control
- Data evaluation
- Reporting

CTEH site management:

- Cory Davis - Project Manager
- Dr. John Kind – Senior Toxicologist

8 Equipment Decontamination

If required, equipment will be decontaminated by the decontamination group where all entries and exits occur. The decontamination will be with damp cloths as the equipment cannot be submerged under water.

9 Field Documentation

During the project, the team members will maintain various field books, reports, electronic database, and logs. Each of the components of the field documentation is described below.

10 Calibration and Maintenance of Field Instruments

The calibration and maintenance of field equipment and instrumentation will be in accordance with each manufacturer's specifications or applicable test/method specifications, and shall be documented in the Calibration Logs or Site Safety and Health Logbooks.

11 Sample Labels and Chain of Custody (COC)

All sample labels used on sample containers will include, at a minimum, a sample identification code, the date of the sample, and the analyte. Each sample will be identified on a chain of custody record. The analytical sample numbering system will include site name, date, analyte, and identification code unique to each sample.

12 Packaging and Shipping

Packaging and shipping of samples will vary depending upon sample media, contaminant concentration, preservation technique, and sample container. The person packaging the samples is responsible to ensure that the sample packaging is in suitable condition for shipping.

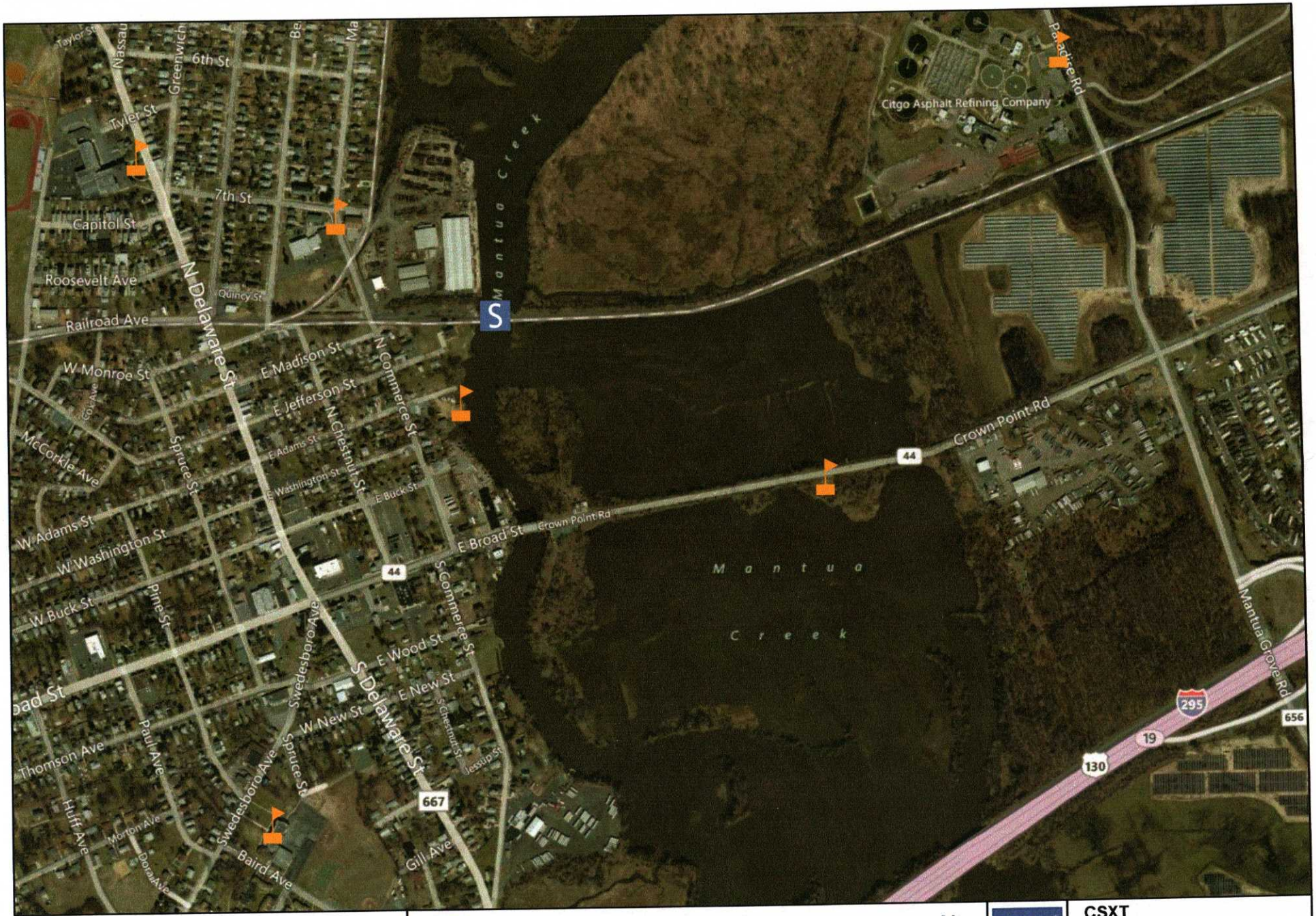
13 References

ACGIH. 2012 TLVs and BEIs: Based on the Documentation of the Threshold Limit values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists; 2012b.

ACGIH. Guide to Occupational Exposure Values 2012. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists; 2012a.

AIHA. 2011 Emergency Response Planning Guidelines (ERPG) and Workplace Environmental Exposure Level (WEEL) Handbook. Fairfax, VA: American Industrial Hygiene Association; 2011.

OSHA. Air contaminant--permissible exposure limits. 29CFR1910.1000



Analytical Air Sampling Locations

S Incident Site

Air Sampling Station

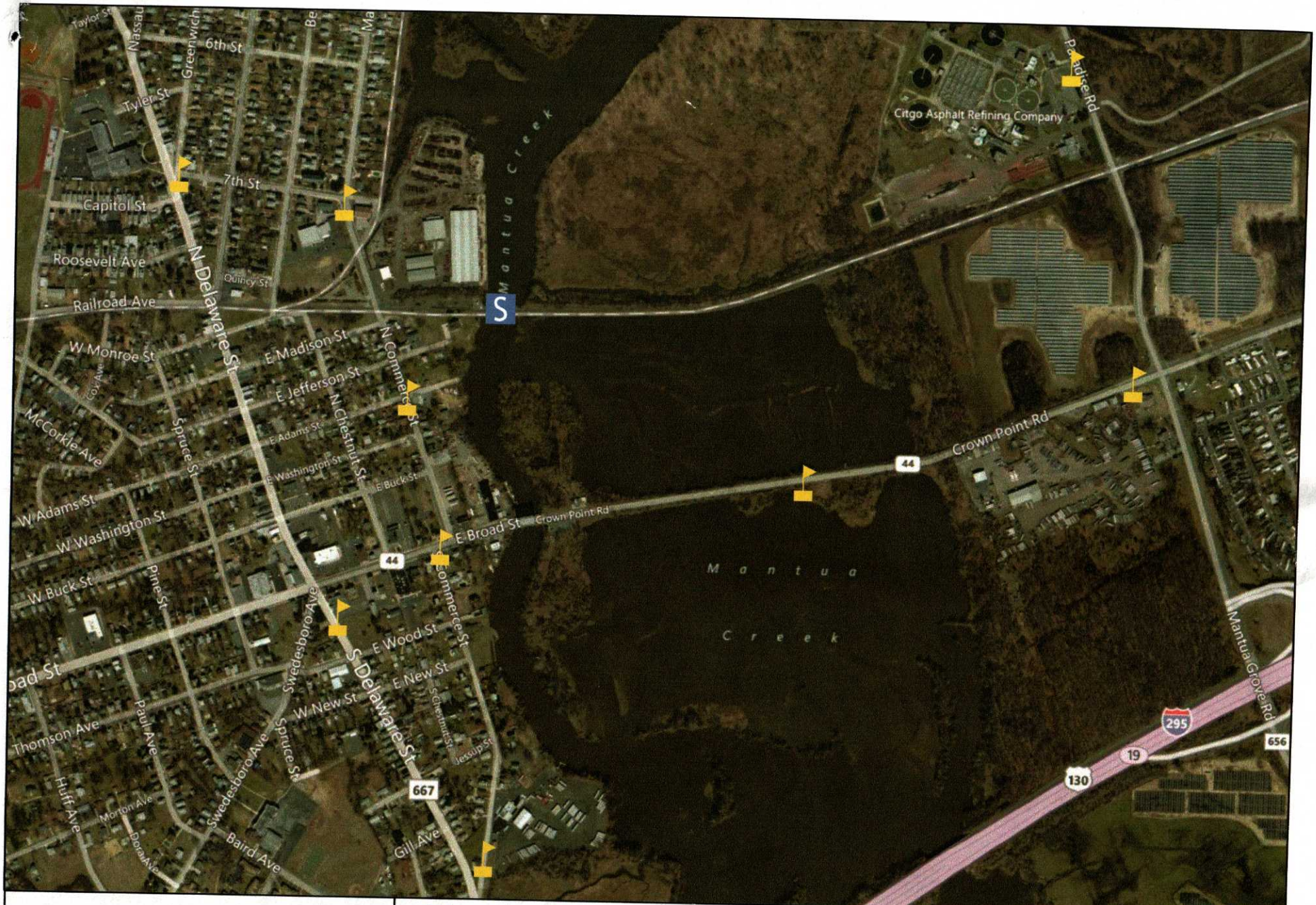
0 50 100 200 300 400 500
Meters

N

CTEH

Project No. 40202

CSXT
Paulsboro, New Jersey
Gloucester County
Print Date: 11/30/2012



Manually Logged Fixed Real-Time Station

S Incident Site

Real-Time Station

0 50 100 200 300 400 500
Meters

N

CTEH	CSXT
	Paulsboro, New Jersey
Project No. 40202	Gloucester County
	Print Date: 11/30/2012